(12) UK Patent Application (19) GB (11) 2 195 558 (13) A

(43) Application published 13 Apr 1988

(21) Application No 8722745

(22) Date of filing 28 Sep 1987

(30) Priority data
(31) 61/240729 (32) 9 Oct 1986 (33) JP

(71) Applicant
Tsukasa Industry Co. Ltd.

(Incorporated in Japan)

2–66 Naka-machi, Handa-shi, Aichi-ken, Japan

(72) Inventor
Fumio Kato

(74) Agent and/or Address for Service
Eric Potter & Clarkson,
14 Oxford Street, Nottingham NG1 5BP

(51) INT CL⁴
B01D 46/02

(52) Domestic classification (Edition J):
B1T DFA

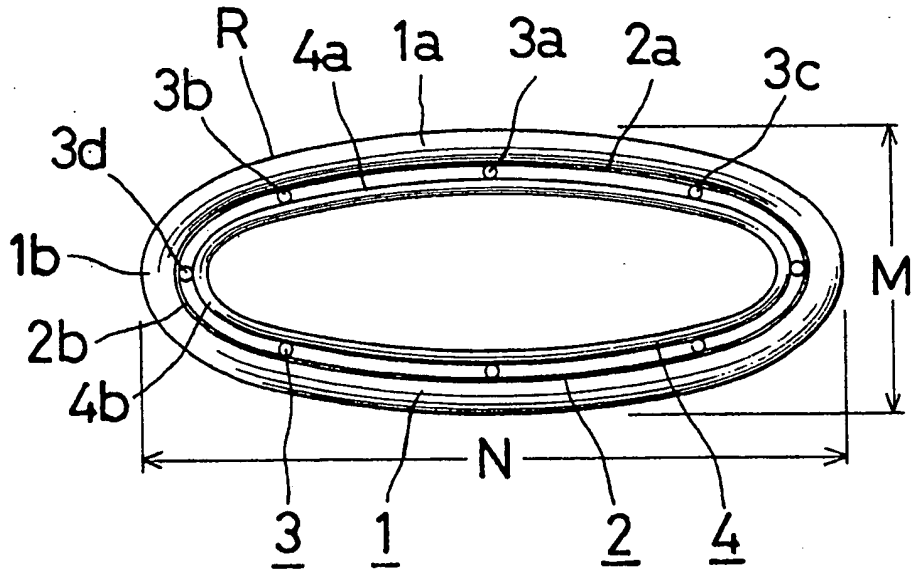
(56) Documents cited
GB 1534158 GB 0990587 EP 0089114
GB 1187646 GB 0974144 US 4150959

(58) Field of search
B1T
Selected US specifications from IPC sub-class B01D

(54) Bag filter

(57) A bag filter comprises a plurality of inward flow filter bags supported by internal frames which give the bags a generally elongate cross-section, e.g. from oval to rectangular. The bag mouths are secured over respective apertures in a horizontal or vertical tube plate. The bags are reverse-flow cleaned by jets directed from nozzle tubes, which extend across the rows of bags in a direction parallel to the smallest width of the bags.

FIG. 2(a)



GB 2 195 558 A

FIG. 1(a)

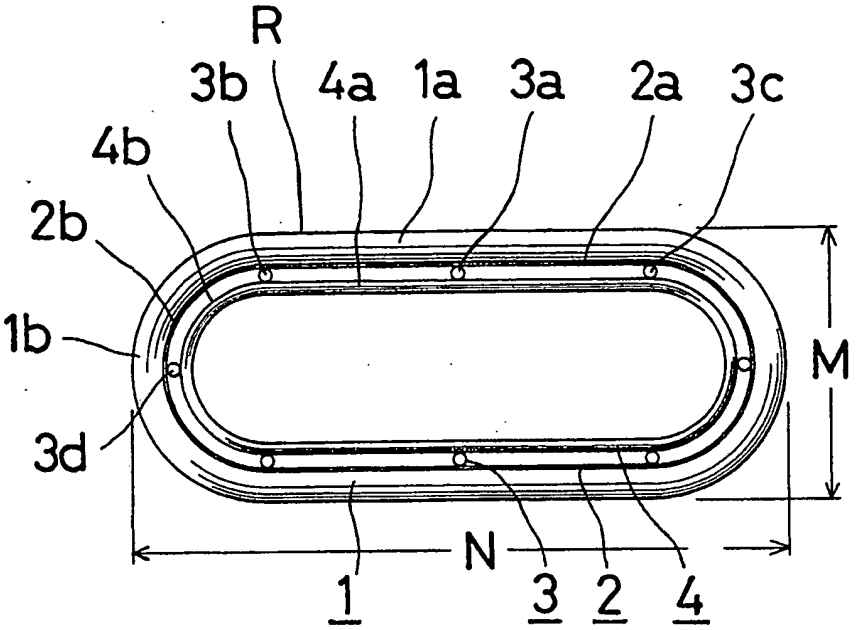


FIG. 2(a)

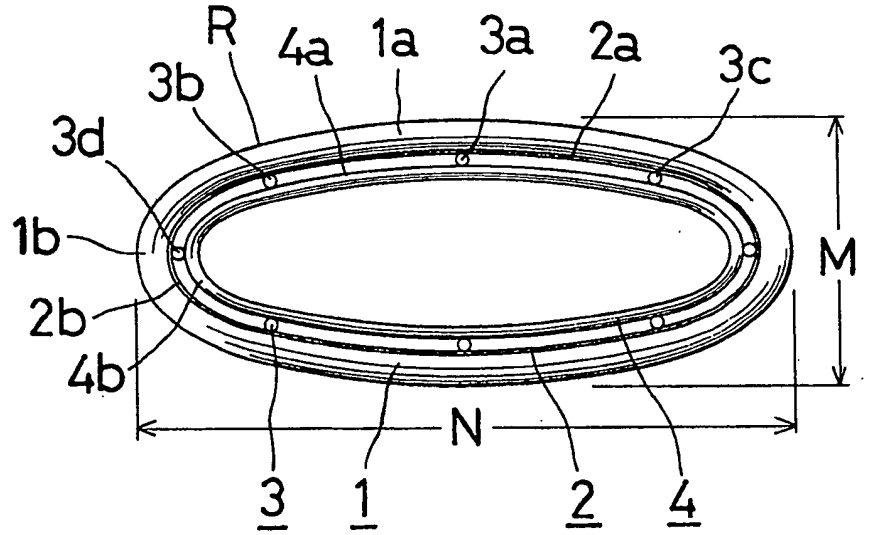


FIG. 1 (b)

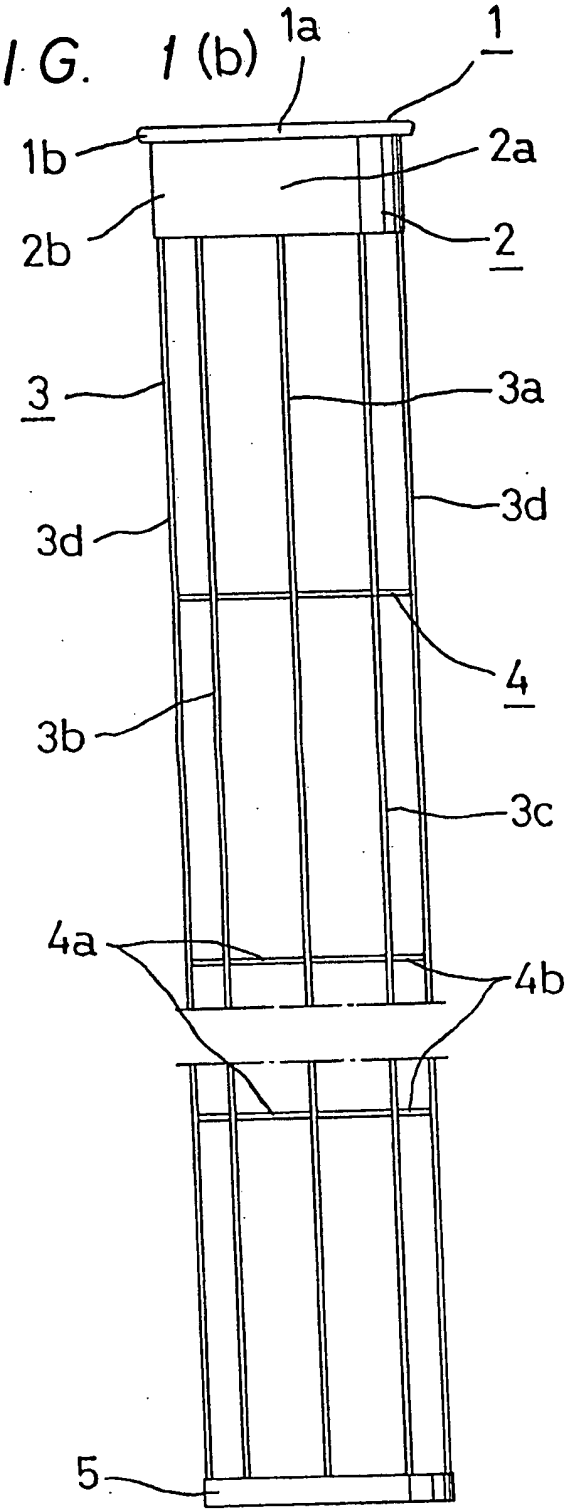


FIG. 1 (c)

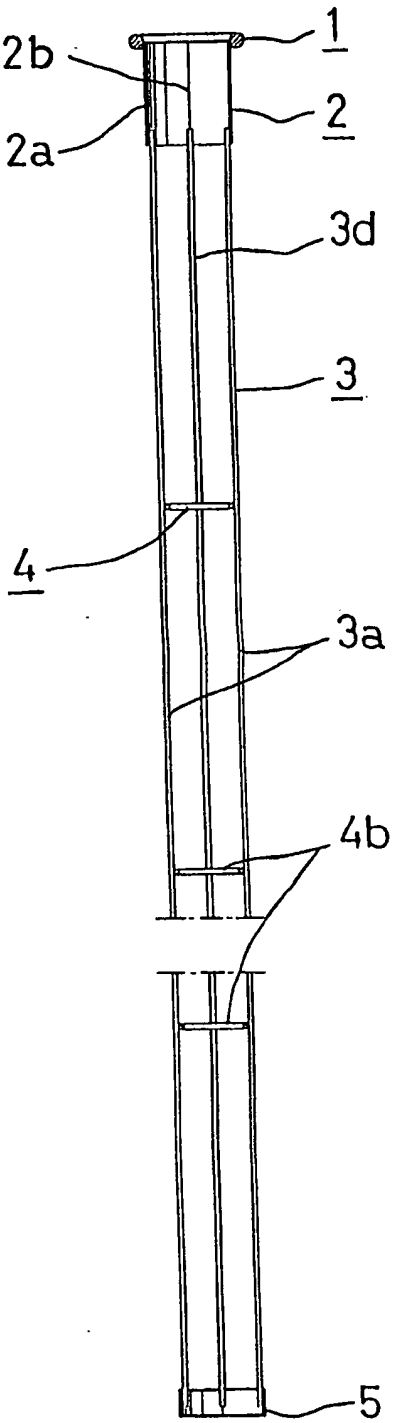


FIG. 2(b)

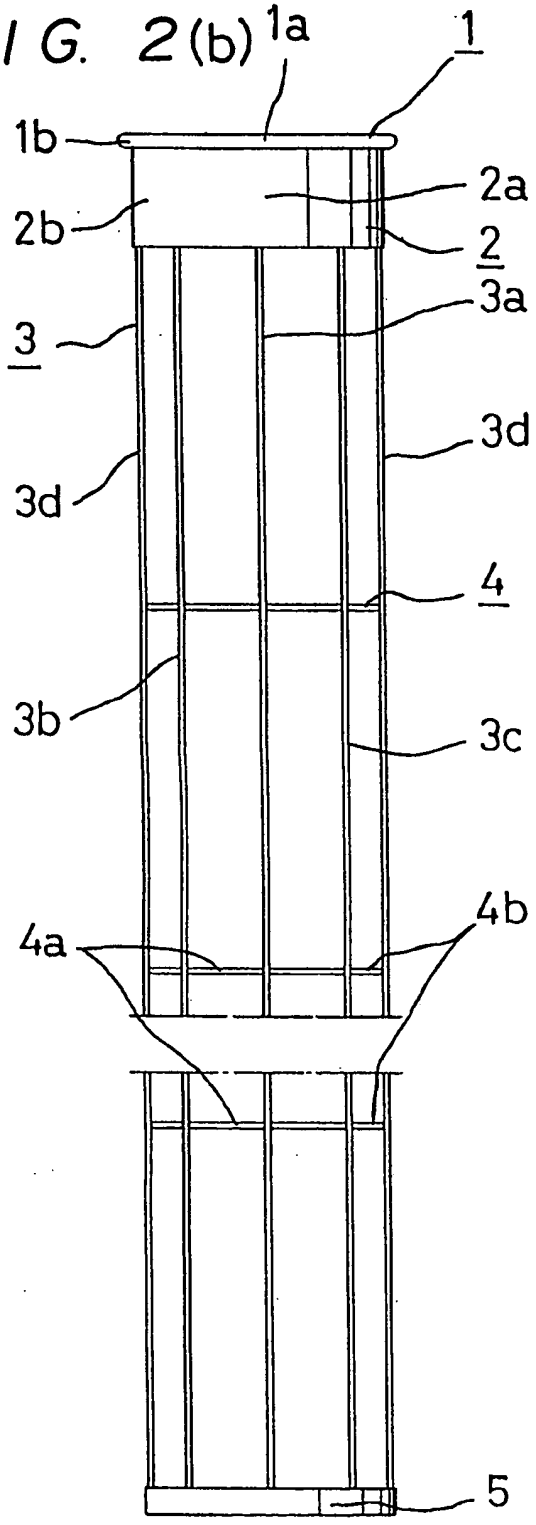


FIG. 2(c)

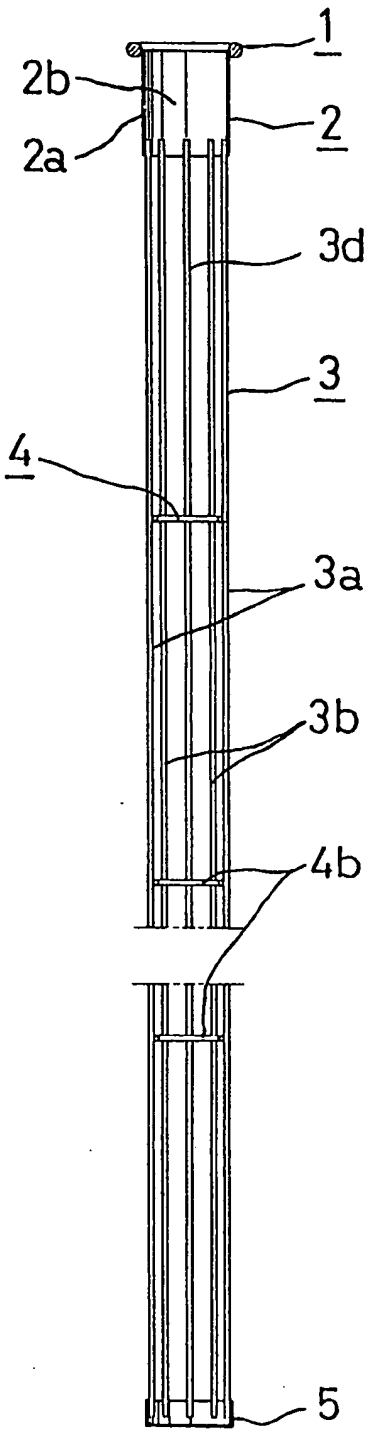


FIG. 3(a)

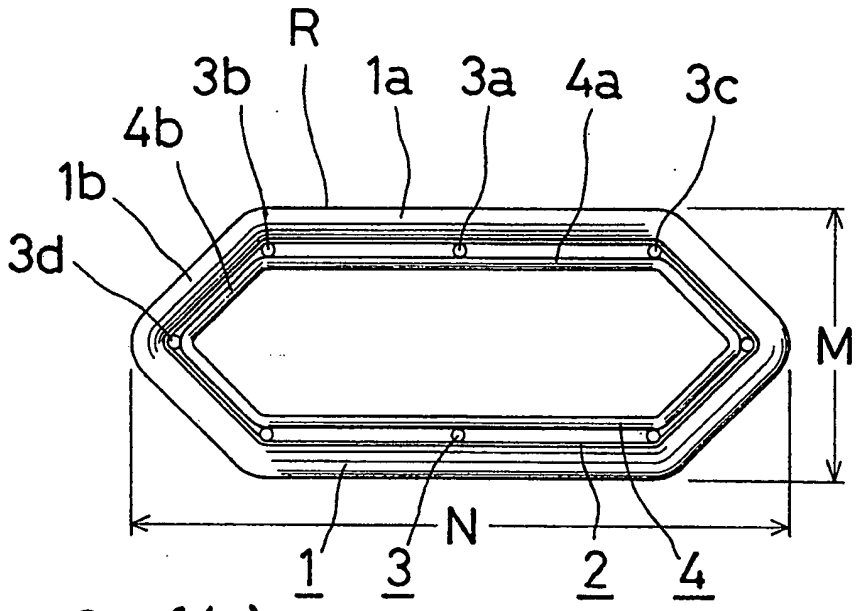


FIG. 4(a)

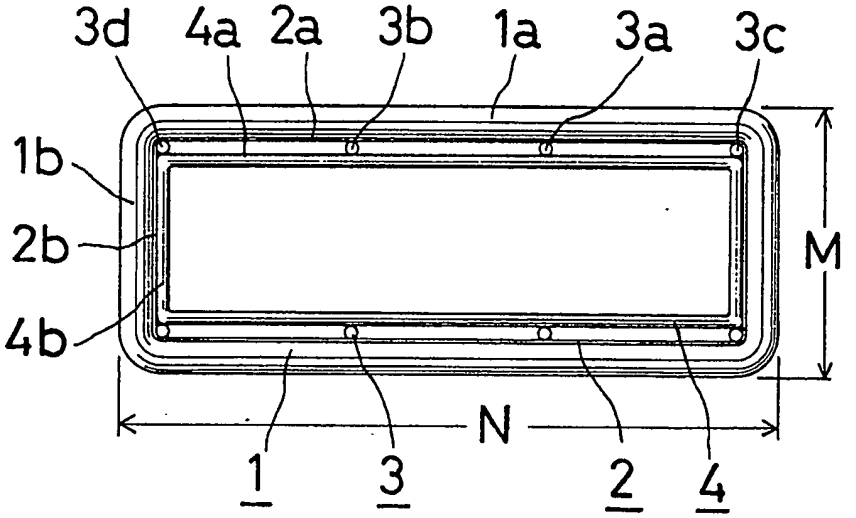


FIG. 3(b)

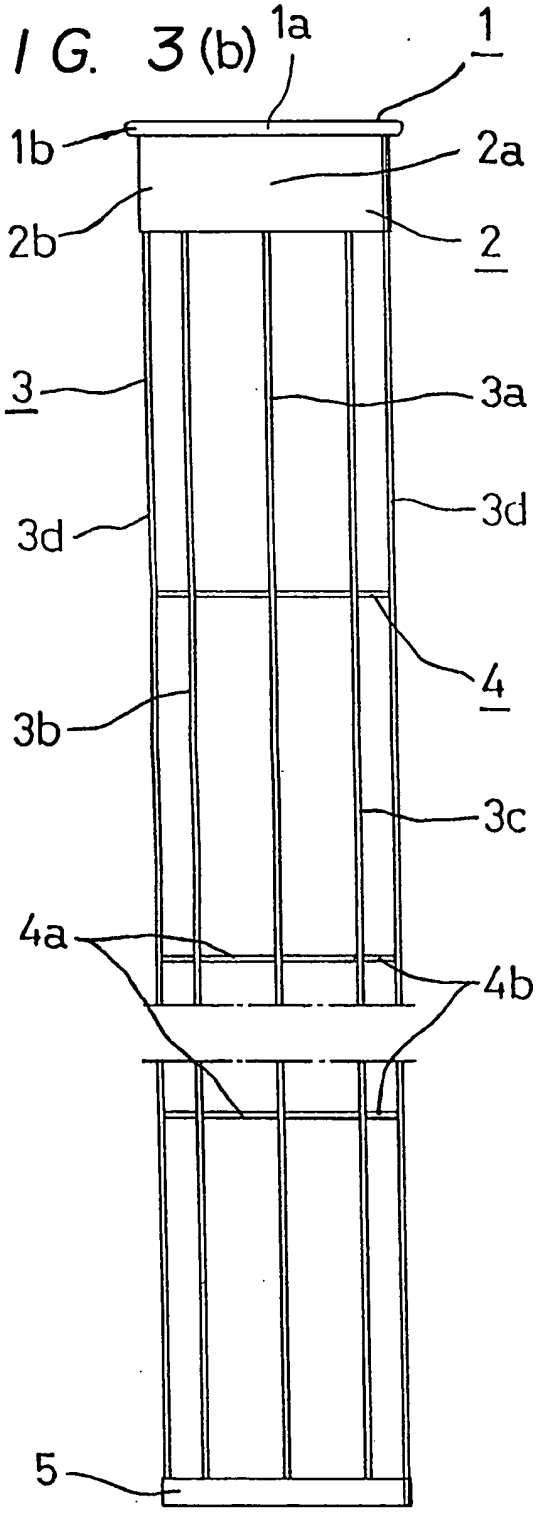


FIG. 3(c)

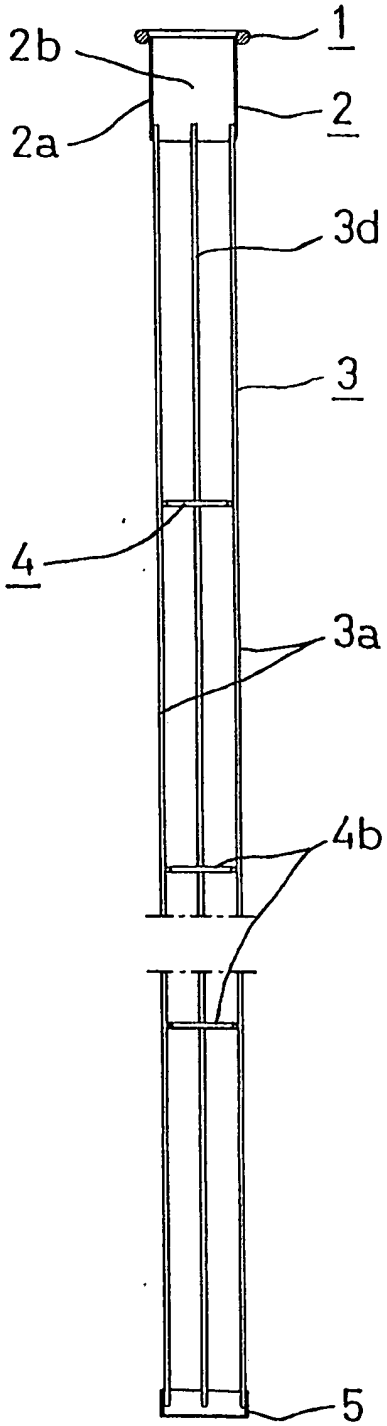


FIG. 4(b)

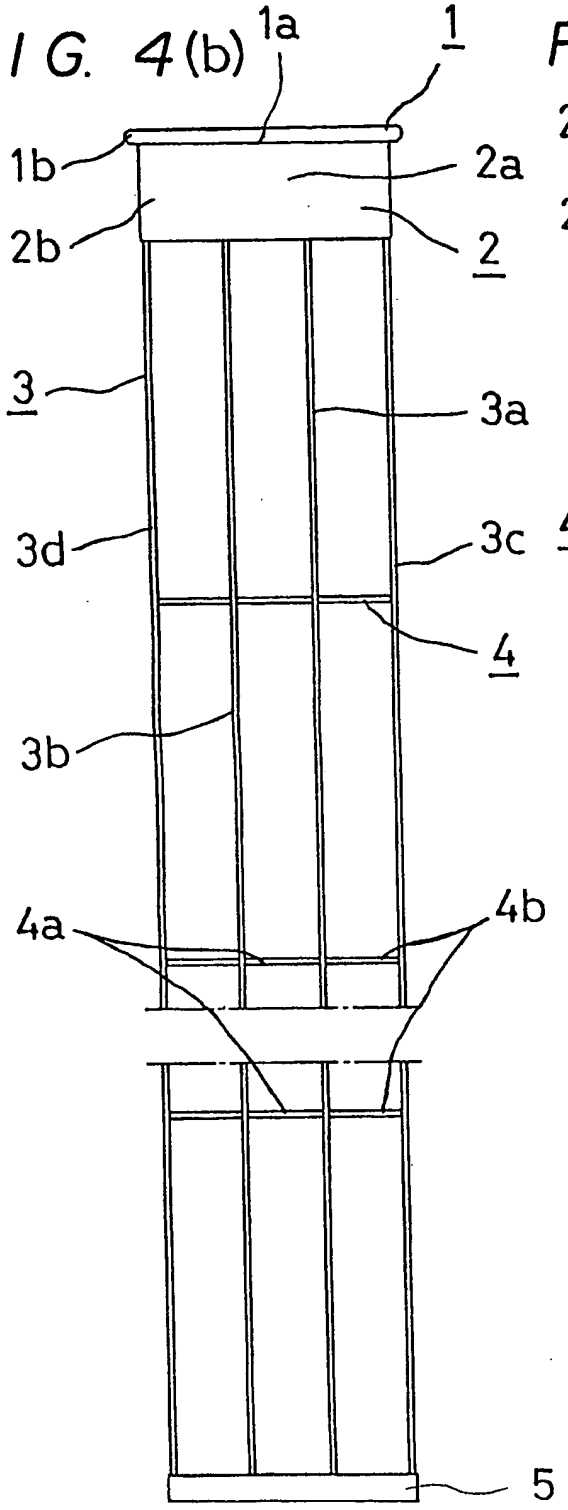


FIG. 4(c)

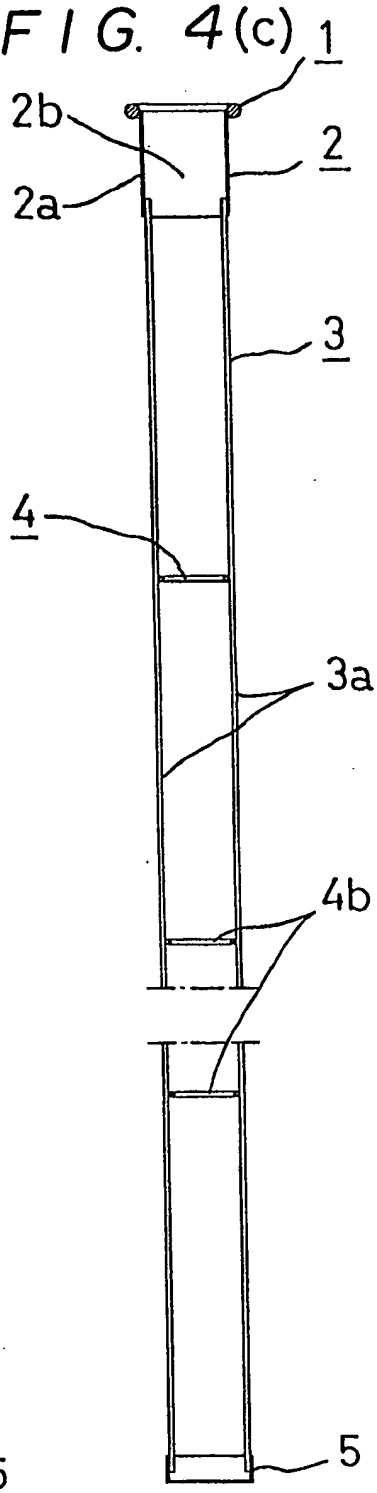


FIG. 5(a)

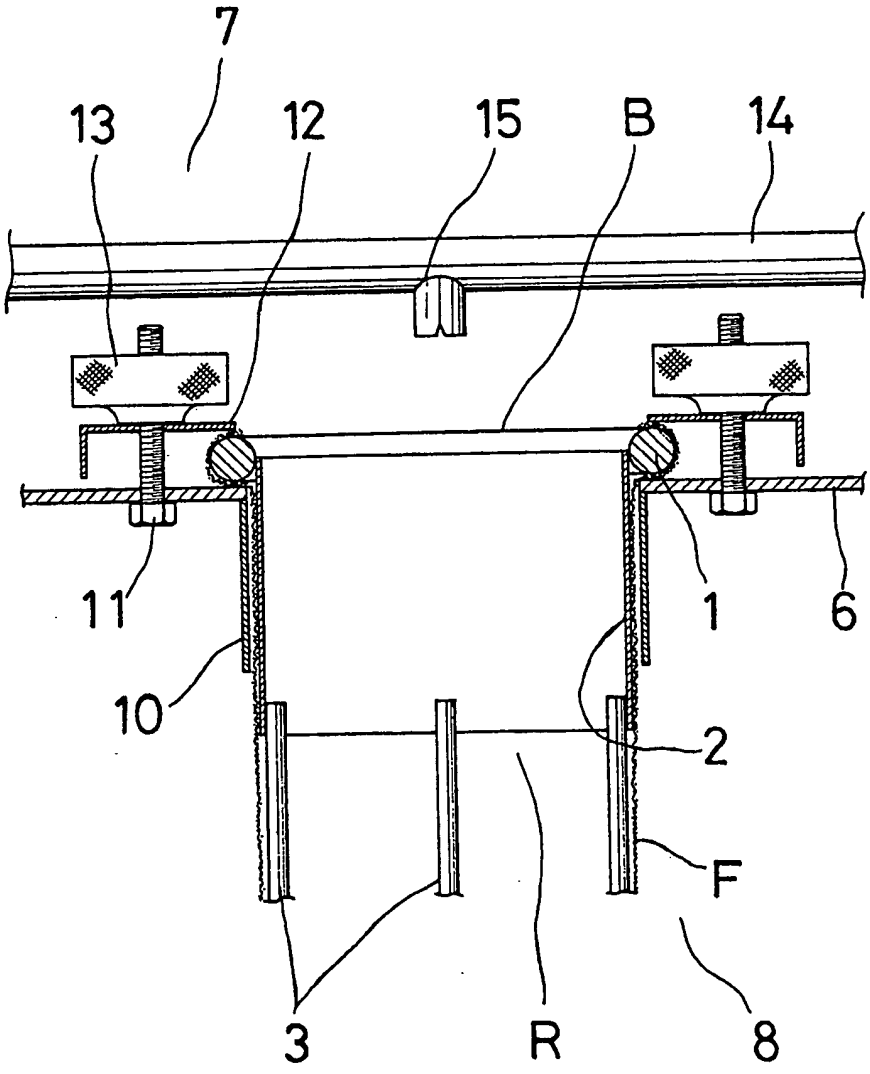


FIG. 5 (b)

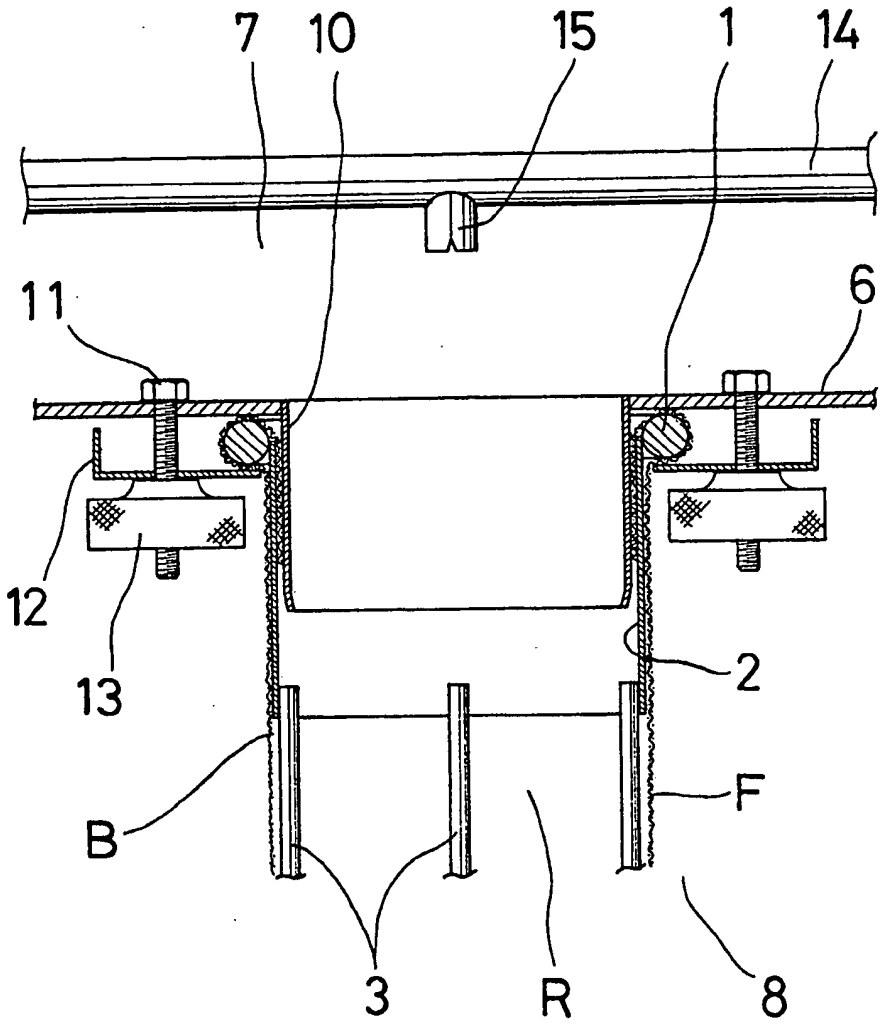


FIG. 5(c)

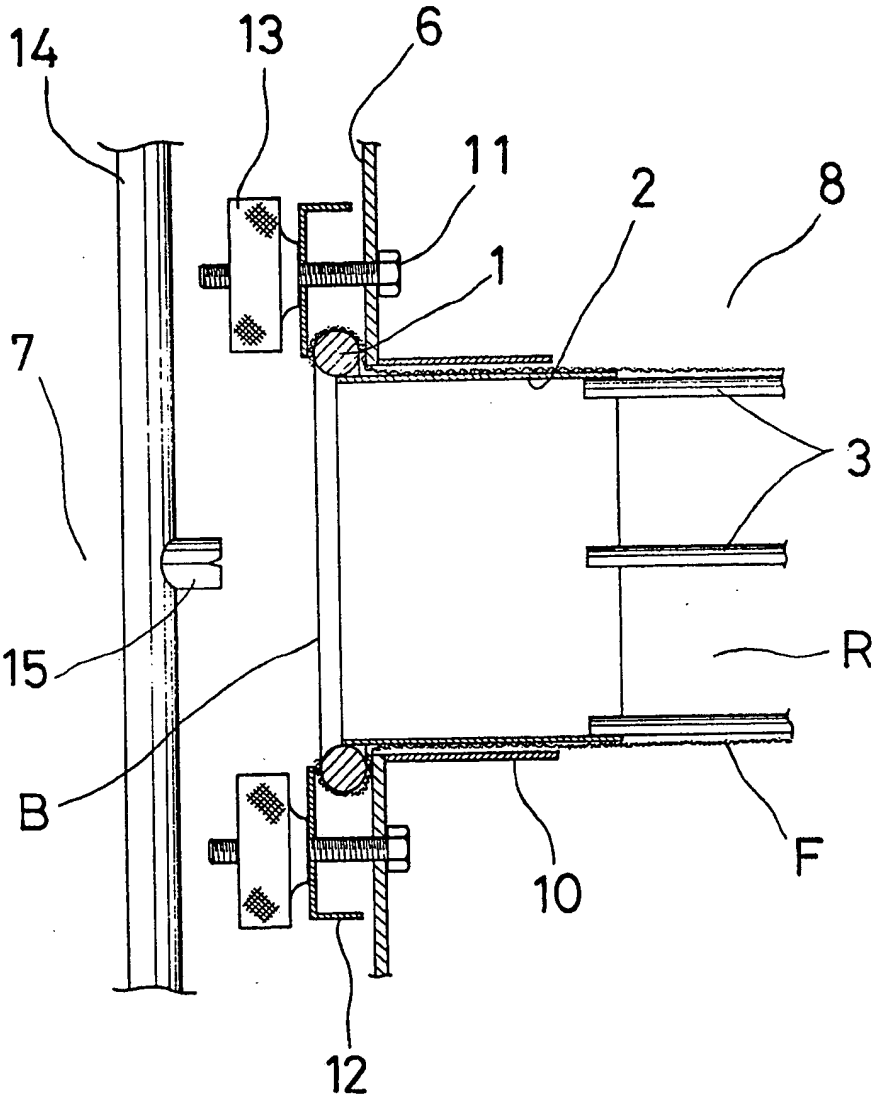


FIG. 6(a)

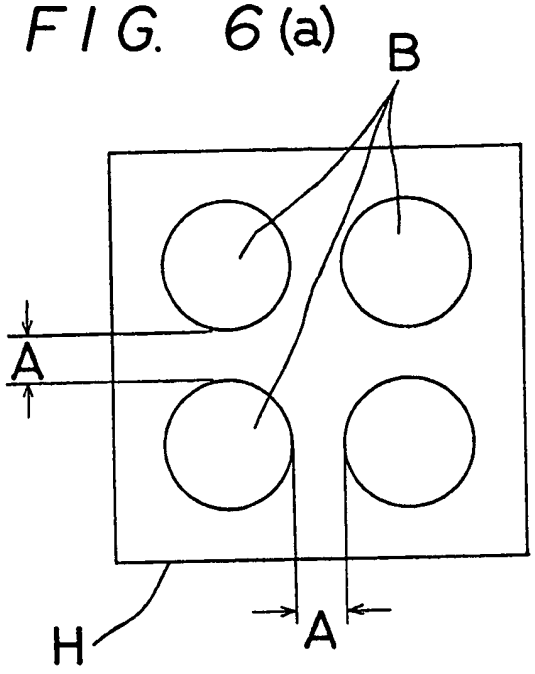


FIG. 6(b)

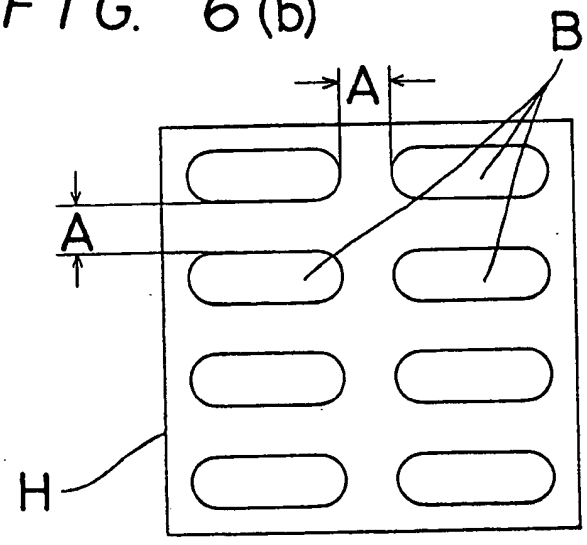


FIG. 7(a)

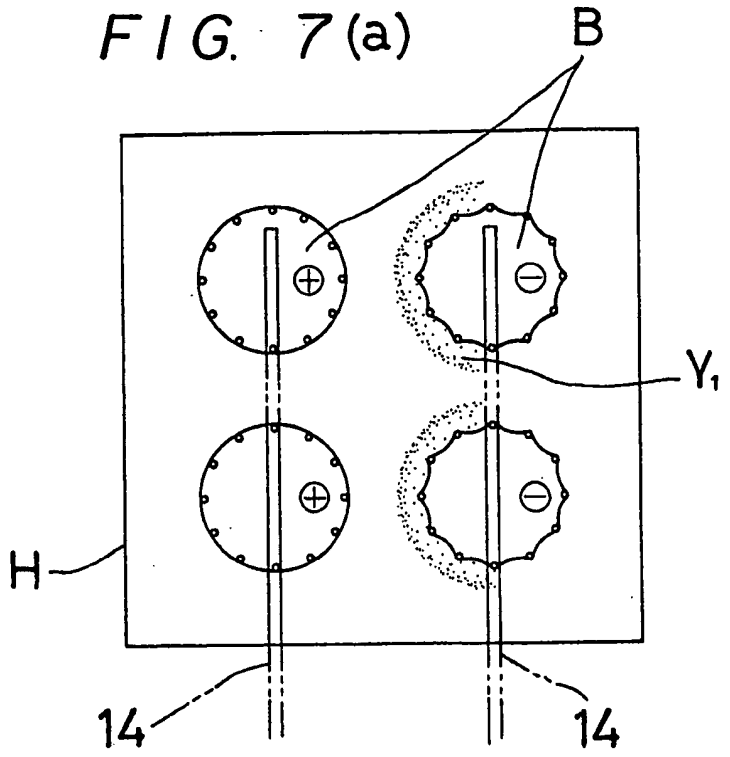


FIG. 7(b)

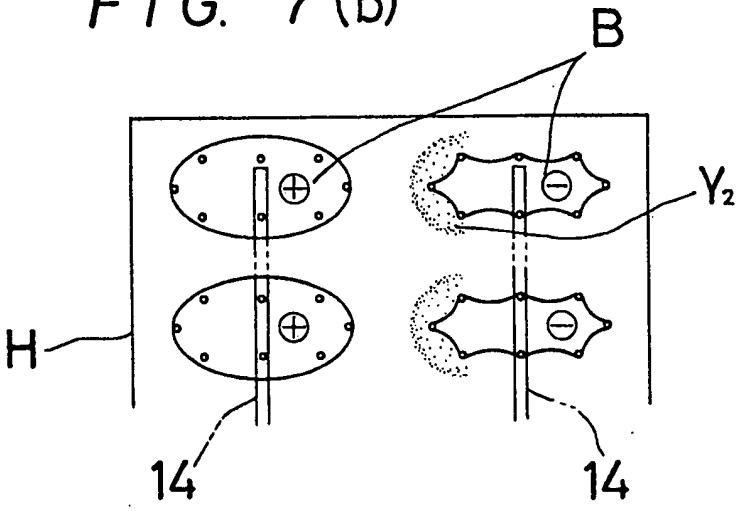


FIG. 8(a)

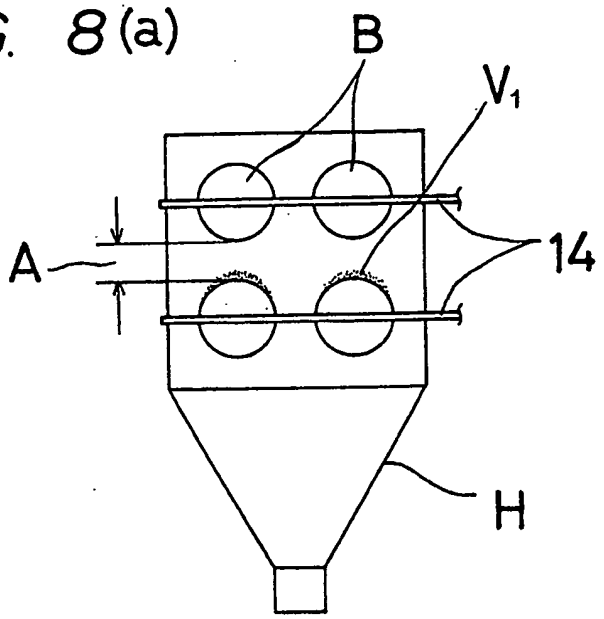


FIG. 8(b)

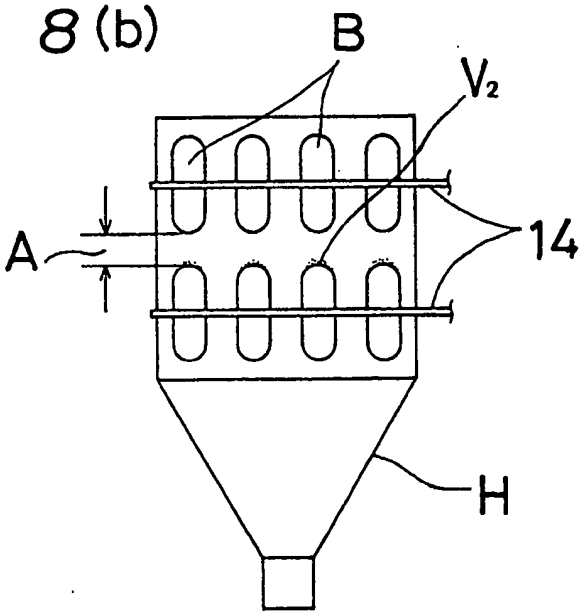


FIG. 9(a)

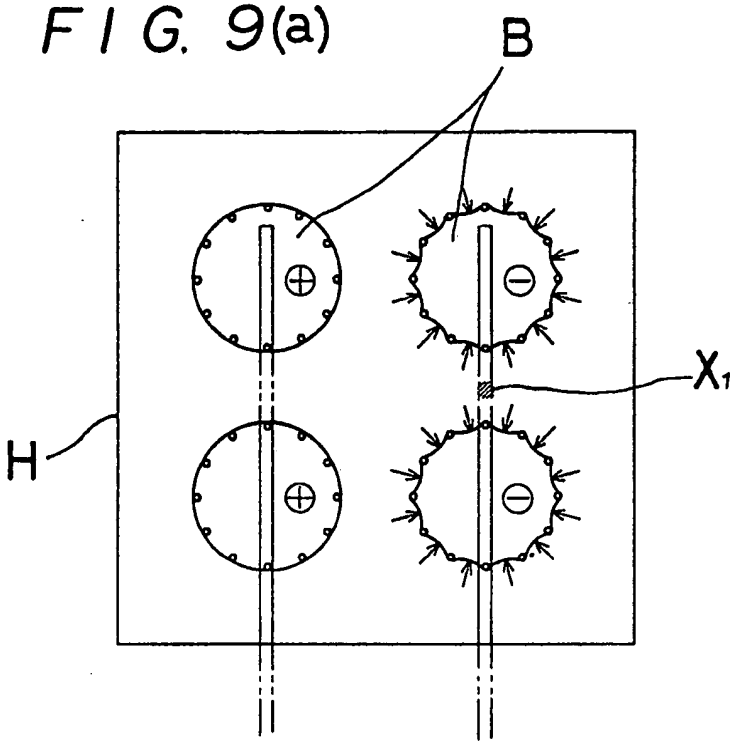


FIG. 9(b)

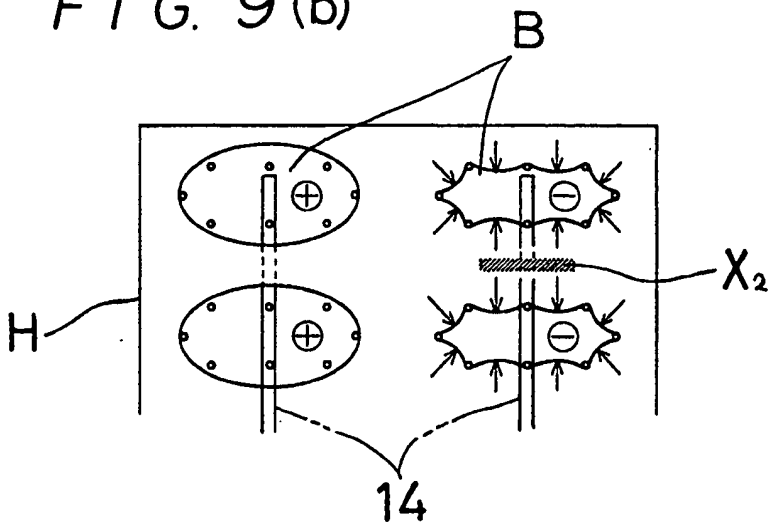


FIG. 10(a)

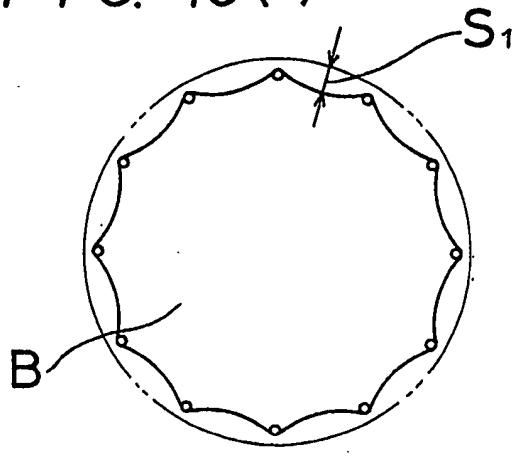
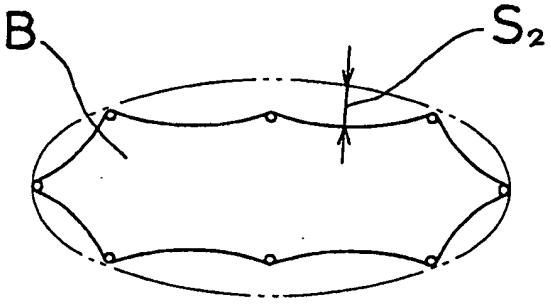


FIG. 10(b)



SPECIFICATION

Bag filter dust collector

This invention relates to a bag filter dust collector.

Filter dust collectors are classified broadly into a vertical type and a horizontal type depending upon the fitting and supporting direction of a bag filter produced by fitting and supporting a filter cloth on a retainer having a frame structure having a cylindrical sectional shape as is known in the art. Among them, in the vertical dust collector, a cell plate (bag filter support plate) formed at the upper part of a dust collector housing divides and defines the housing into an upper clean air chamber and a lower dust-containing air chamber, the open end of the bag filter is suspended and vertically supported at a fitting through-hole bored at a grid-like position of the cell plate and blow tubes are arranged for each bag filter line either longitudinally or transversely. In the case of the horizontal dust collector, a fitting through-hole is formed on a vertical cell plate dividing the dust collector housing to the right and left, the open end portion of a bag filter is fitted to the through-hole and supported horizontally and blow tubes are arranged on the side of the open end of the bag filter. The dust in the dust-containing air is collected and the dust thus collected is wiped off for each filter line.

Commonly, the bag filter in these cases has a cylindrical shape at its mouth edge and is produced by fitting and supporting a filter cloth to a substantially cylindrical retainer whose main body has a regular octagonal grid-like frame. A plurality of bag filters may suitably be arranged in a grid form with predetermined spacings between them in a rectangular (or cylindrical) dust collector housing, for example as shown in Figure 6(a). The spacing between the filters is set in accordance with the performance and diameter of the filter cloth and with the dust collection efficiency and dust removing efficiency of the filter dust collector. If the spacing is unnecessarily narrow, when the filter cloths that are inflated by jetting reverse cleaning air for wiping off the dust collected on the filter cloths of the bag filters come into contact with one another, pulsation and surge towards the tip of the filter are impeded and there exists no dropping space for the dust that is wiped off and it is once again absorbed by the filter cloths of the adjacent bag filter lines, thereby significantly reducing the dust removing efficiency.

Even if an attempt is made to improve the dust collection efficiency without reducing the dust removing efficiency, there is a limit to the amount of storage and storage efficiency of bag filters in the dust collector housing in a structure where the retainer for fitting and supporting the filter cloth has a substantially cylindrical shape. It is desirable to increase the surface area of the filter in order to improve the dust collection efficiency without reducing the spacing between the bag filters.

This can be accomplished, to some extent, by increasing the diameter of the dust collector housing to increase its capacity as much as possible and to increase the amount of storage of bag filters as well. However, the dust collector becomes great in size and needs a large installation space in this case and this is contradictory to the requirements for the reduction of the installation cost and for more compact dust collectors. Another method is to increase the surface area of the bag filter to be fitted to a predetermined cell filter without increasing the size of the dust collector and without changing the capacity of the dust collector housing. In order to increase the surface area of the bag filter to be supported by the predetermined cell plate, it is more advantageous in this case to employ a filter cloth having a small diameter than to employ a filter cloth having a large diameter, for, the circumference is proportional to 2R while the area is proportional to R^2.

If the diameter of the filter cloth is reduced excessively, however, it becomes difficult for high pressure reverse cleaning air to reach the tip of the filter cloth at the time of reverse cleaning by the high pressure reverse cleaning air jetted from the jet nozzle of the blow tube, that is, at the time of wipe-off of the dust and consequently, the wipe-off efficiency of the dust collected and adsorbed on the filter cloth is remarkably reduced.

In one aspect the invention provides a bag filter collector in which a filter cloth is fitted to and supported by a retainer having a frame structure to provide a bag filter having a cylindrical shape, a plurality of said bag filters is suspended on separator means, and blow means are disposed for jetting reverse cleaning air to said filters, wherein the spacing between one pair of opposed sides of said retainer is relatively small while the spacing between the other pair of opposed sides is relatively great.

In preferred bag filter dust collectors according to the present invention a retainer is first formed to a cylindrical shape in such a manner, viewed in cross-section, that one opposite pair of sides has a relatively small retainer width (viz. spacing) while the other has a relatively large retainer width, instead of a substantially circular cross-sectional shape of the conventional cylindrical retainer. Thus the bag filter retainer of a preferred collector has a frame structure which is non-circular in section the spacing between one pair of opposite sides being less than the spacing between another and has a substantially oval, substantially acute oval or substantially rectangular shape so that the retainer widths in both long-

itudinal and transverse directions are different on the premise that the existing filter cloth having a large outer peripheral length can be fitted to the retainer, and thus improves drastically the storage capacity of the bag filters in the dust collector housing and the storage efficiency of the bag filters. On the other hand, the dust wipe-off efficiency of the collected dust per unit filter cloth is improved drastically so that the dust collector housing can be made compact. Additionally, in the preferred collector blow tubes are arranged in such a manner as to cross at right angles the filter length having a relatively great retainer width (i.e. at right angles to the greatest dimension viewed in section) whereby the wipe-off efficiency of the collected dust can be improved at the time of reverse cleaning.

Reference is now made to the accompanying drawings, showing several embodiments of the invention, in which:

Figures 1(a), 1(b) and 1(c) are, respectively, plan, front and longitudinal sectional side views of a bag filter retainer having a substantially oval shape in accordance with a first embodiment of the present invention;

Figures 2(a), 2(b) and 2(c) are, respectively, plan, front and longitudinal sectional side views of a bag filter retainer having a substantially oval shape in accordance with a second embodiment of the present invention;

Figures 3(a), 3(b) and 3(c) are, respectively, plan, front and longitudinal sectional side views of a bag filter retainer having a substantially acute oval shape in accordance with a third embodiment of the present invention;

Figures 4(a), 4(b) and 4(c) are, respectively, plan, front and longitudinal sectional side views of a bag filter retainer having a substantially rectangular shape in accordance with a fourth embodiment of the present invention;

Figures 5(a), 5(b) and 5(c) are enlarged views of principal portions and show the fitting of a bag filter, wherein 5(a) shows an upper surface insertion type, 5(b) shows a suspension type and 5(c) shows a side surface insertion type;

Figures 6(a) and 6(b) are comparative views and show the state where adjacent bag filters are stored with predetermined spacings between them in a dust collector housing having substantially the same size, wherein 6(a) shows the state of storage of a conventional cylindrical bag filter, and 6(b) shows the state of storage of an oval bag filter;

Figures 7(a) and 7(b) are comparative views and show the zones that hinder the drop of the dust in a vertical dust collector, wherein 7(a) shows the case of a conventional cylindrical bag filter and 7(b) shows the case of an oval bag filter;

Figures 8(a) and 8(b) are side views and show the case where bag filters are stored in a horizontal dust collector, wherein 8(a) shows the state of storage of a conventional cylindrical bag filter and 8(b) shows the state of storage of an oval bag filter;

Figures 9(a) and 9(b) are comparative views and show the zones where suction force of the dust in the vertical dust collector becomes low, wherein 9(a) shows the case of a conventional bag filter and 9(b) shows the case of an oval bag filter; and

Figures 10(a) and 10(b) are comparative views and show the change quantity of a filter fitted to a retainer, wherein 10(a) shows the case of a conventional cylindrical filter and 10(b) shows the case of an oval bag filter.

Figures 1(a) to 1(c) shows a first embodiment of a bag filter retainer R having a substantially cylindrical and oval sectional shape, reference numeral 1 represents a fitting ring at a retainer mouth edge. This ring 1 is shaped in a substantially oval shape by bending one rod in such a fashion that its longer sides 1*a* are parallel to each other while its shorter sides 1*b* are curved in a semi-arcuate form and the spacing, namely the retainer width M, between the opposed parallel sides 1*a* is relatively small while the spacing, namely the retainer width N along the other opposed arcuate shorter sides 1*b* is relatively large. Reference numeral 2 represents a guide cylinder fixed to the fitting ring 1. It has a substantially oval cylindrical shape with its longer sides being parallel planes 2*a* and its shorter sides being semi-arcuate surfaces 2*b*.

Reference numeral 3 represents elongated rod-like connection rods which are fixed at their upper ends to the guide cylinder 2. About eight, in total, of the connection rods 3 are disposed at the centres 3*a* of the parallel planes 2*a*, at both sides 3*b*, 3*c* of the parallel planes 2*a* and at the centres 3*d* of the semi-arcuate surfaces 2*b*. Reference numeral 4 represents a reinforcing ring. A plurality of these reinforcing rings 4 are fixedly disposed with suitable spacings between them in the longitudinal direction of the connection rods 3. In the same way as the fitting ring 1, each reinforcing ring is shaped in a substantially oval ring-like shape by bending one rod in such a fashion that its longer sides 4*a* are parallel to each other while its shorter sides 4*b* are semi-arcuate, in the same way as the fitting ring 1.

Reference numeral 5 represents a cap which is fitted and fixed to the lower ends of the connection rods 3. It has a substantially oval lid-like shape in the same way as the fitting ring 1, the guide cylinder 2 and the reinforcing ring 4. Thus, the retainer R has, in total, a substantially oval grid-like frame structure.

The second embodiment of the retainer R has a substantially oval frame structure as shown in Figures 2(a) to 2(c). It has a relatively large radius in the direction of the major axis with a relatively small retainer width M and a relatively small radius in the minor direc-

More definitely, the fitting ring 1 and the reinforcing ring 4 constituting the retainer R are each formed in a substantially oval shape by bending one rod in such a manner that the longer sides 1*a*, 4*a* have an arcuate form, having a relatively large radius, while the shorter sides 1*b*, 4*b* have an arcuate form having a relatively small radius. The guide cylinder 2 has a substantially oval cylindrical shape with its longer sides describing an arcuate plane 2*a* having a relatively large radius and its shorter side, an arcuate plane 2*b* having a relatively small radius. The lid shape of the cap 5 describes a substantially oval shape, too. The connection rods 3 are disposed at the same position as in the first embodiment and the retainer R has, in total, a substantially oval grid-like frame structure.

The third embodiment of the retainer R has a substantially acute oval cylindrical shape as shown in Figures 3(a) to 3(c). The longer sides are parallel to each other with a relatively small retainer width M between them while the shorter sides are mountain-shaped (having an apex) with a relatively large retainer width N between them.

More definitely, the fitting ring 1 and the reinforcing ring 4 constituting the retainer R are each formed in a substantially acute oval ring-like shape by bending one rod in such a manner that the longer sides 1*a*, 4*a* are parallel to each other and the shorter sides 1*b*, 4*b* are mountain-shaped. The guide cylinder 2 is shaped in a substantially acute oval cylindrical shape in such a manner that the longer sides 2*a* are parallel planes while the shorter sides 2*b* are mountain-shaped. The lid shape of the cap 5 has a substantially acute oval shape, too. The connection rods 3 are disposed in the same relation of position as in the first embodiment and the retainer has as a whole a substantially acute oval grid-like frame structure.

The fourth embodiment of the retainer R has a substantially rectangular cylindrical shape as shown in Figures 4(a) to 4(c). The longer sides of the retainer R are parallel planes with a relatively smaller retainer width M and the shorter sides are parallel planes, too, but with a relatively large retainer width N.

More definitely, the fitting ring 1 and the reinforcing ring 4 constituting the retainer R are each formed in a substantially rectangular ring-like shape by bending one rod in such a manner that the longer sides 1*a*, 4*a* are parallel to each other and the shorter sides 1*b*, 4*b* are parallel, too. The guide cylinder 2 is shaped in a substantially rectangular cylindrical shape so that the longer sides are parallel planes 2*a* while the shorter sides are parallel planes 2*b*, too. The lid shape of the cap 5 is substantially rectangular, too. Eight, in total, of connection rods 3*a*, 3*b*, 3*c* and 3*d* are disposed at positions that divide the parallel planes 2*a* of the guide cylinder 2 into three equal portions, unlike the first embodiment, and the retainer R has thus a substantially rectangular grid-like frame structure.

In using the bag filters described above with reference to the drawings in dust collectors embodying the invention a filter cloth F having a predetermined diameter is fitted to, and supported by, the cylindrical retainer R for a bag filter in each of the first to fourth embodiments described above, and the open end portion of the bag filter B is wrapped up into the fitting ring 1 of the retainer R and then fixed as shown in Figures 5(a) to 5(c). In the drawings, reference numeral 6 represents a cell plate that provides separator means which divides a housing H of a dust collector into a clean air chamber 7 and a dust-containing air chamber 8. The cell plate 6 is formed at the upper part of the dust collector housing H in the horizontal direction in a vertical dust collector and in the vertical direction in the case of a horizontal dust collector.

A fitting through-hole is bored at the grid-like positions of the cell plate 6. Reference numeral 10 represents a guide cylinder that is fixed to the mouth edge portion of the through-hole. It has an oval, acute oval or rectangular shape. Reference numeral 11 represents a fitting bolt fixed to the cell plate 6 at the peripheral edge of the through-hole and reference numeral 12 represents a ring-like clamp plate. It is open at its centre in an oval, acute oval or rectangular shape in substantially the same shape as that of the fitting ring 1. The outer peripheral edge of the clamp plate 12 is bent towards the cell plate 6. Reference numeral 13 represents a knob nut that meshes with the fitting bolt 11.

Figure 5(a) shows an upper surface insertion type as one definite example of fitting means for the bag filter. After an upper lid (not shown) of the vertical dust collector is opened, the bag filter B having the filter cloth F fitted into and supported by the retainer R is fitted from above into the guide cylinder 10 having the same shape as the retainer R, its main body portion is dropped into the dust-containing air chamber 8 in the dust collector housing H and the open end of the bag filter B is then anchored to and held by the mouth edge of the through-hole.

Next, the clamp plate 12 is fitted into the fitting bolt 11 and then the knob nut 13 is engaged and fastened, whereby the upper surface portion and lower surface portion of the fitting ring 1 about which the open end portion of the filter cloth F is wrapped up are clamped and the cloth fixed to the ring.

Figure 5(b) shows a suspension type. The bag filter B is fitted from below over the guide cylinder 10 of the cell plate 6 from the lower portion of the dustcontaining air chamber 8 of the vertical dust collector, the clamp plate 12 is fitted from below to the fitting bolt 11 and then the knob nut 13 is engaged and

fastened. Thus the lower surface portion and the upper surface portion of the fitting ring 1 to which the open end of the filter cloth F is wrapped up are pressed between the lower surface of the cell plate 6 and the upper surface of the clamp plate 12 so that the bag filter B is suspended by the cell plate 6.

Figure 5(c) shows a side surface insertion type. In this type the bag filter B is inserted from the side portion of the dust collector housing H into the vertical cell plate 6 that divides the dust collector housing H in the horizontal dust collector into the clean air chamber 7 and the dust-containing air chamber 8 and the filter fixed and supported. The rest of the constructions are substantially the same as those of the upper surface insertion type described above.

After the substantially oval bag filters B are arranged adjacent to one another with a predetermined spacing A between them as shown in Figure 7(b) in the case of the vertical dust collector and in Figure 8(b) in the case of the horizontal dust collector, blow means, namely blow tubes 14 for jetting reverse cleaning air into the bag filter B are arranged in such a manner as to cross as right angles the line of filters having a relatively large retainer width N of the bag filter retainer R (e.i. parallel with the relatively narrow dimension M), and jet nozzles 15 are formed so as to face the cylinder centre of the retainers R as shown in Figures 5(a) to 5(c).

When a blower (not shown) connected to the outlet side of the clean air chamber 7 of the bag filter dust collector sucks the clean air, the dust-containing air is sucked into the dust collector housing H from the inlet of the dust-containing air chamber 8 and most of the dust is adsorbed and collected by the filter cloth F fitted to the retainer R.

In this case, the bag filter B exhibits the shape where it is suspended in a wave-like shape between the connection rods 3 of the retainer R as shown in Figure 9(b). The dust is absorbed to the surface of the bag filter B and collected while the dust existing in the zone which is formed between the adjacent filters and has a relatively low suction force drops towards the bottom of the dust collector housing H and collected there.

On the other hand, when the high pressure reverse cleaning air is jetted instantaneously into each bag filter B from the jet nozzle 15 of each blow tube arranged for each of the predetermined filter line, the impact force acts upon each bag filter from inside to outside the bag filter so that each bag filter B attempts to get round as much as possible and inflates instantaneously into the substantially oval shape. Accordingly, the dust collected by the bag filter B is shaken off from the bag filter B, and since the impact force due to the reverse gly towards the tip of each bag filter B, the dust collected by the bag filter B is shaken off from the bag filter and dropped into the bottom of the housing H.

The performance of the dust collector is thus improved because the dust collecting operation and the dust removing operation described above can be repeated appropriately.

The effect of the bag filter of the first embodiment wherein the filter cloth is fitted to and supported by the substantially oval retainer as a typical embodiment of the present invention will be described in comparison with the effect of the conventional bag filter wherein the filter cloth is fitted to and supported by the substantially cylindrical retainer.

(1) Storage efficiency of bag filters having an equal outer peripheral length in the dust collector housing and the number of storage of the bag filters can be increased drastically as shown in Figure 6(b).

The filtration speed and the passing air quantity of the filter cloth in the filter dust collector are determined by the number of filter cloths stored in the dust collector housing. In comparison with the cylindrical retainer, the oval retainer can reduce the cross-sectional area and volume. Therefore, the number of storage of the filter cloths in the dust collector housing can be increased in proportion to the decrease of the volume. For instance, if the sectional-area of one filter cloth can be reduced to half, the number of stored filter cloths can be doubled. Accordingly, the dust collection efficiency and dust removing efficiency can be improved drastically.

(2) For the reason described above, if the dust collection efficiency and the dust removing efficiency are set to substantially the same level as that of the conventional dust collector, the size of the dust collector housing can be made compact, the cost of installation can be reduced and the space of installation can be reduced as much, too.

(3) The necessary amount of the reverse cleaning air can be reduced at the time of the reverse cleaning operation in proportion to the decrease of volume per unit filter cloth so that the running cost as the bag filter dust collector can be reduced drastically.

(4) When compared with the case where the filter cloths are arranged to the cylindrical retainers in all directions with predetermined spacings, the zone X_2 having lower suction force shown in Figure 9(b), that is, the zones having balanced suction force are more easily formed in the belt-like shape when the filter cloths are arranged in the grid-like shape on the oval retainers. Accordingly, the dust is not affected by the influence of the suction force on the adjacent bag filters and can more freely drop. In other words, the free drop zone below the floating speed of the dust becomes greater in the case where the oval re-

the cylindrical retainers are arranged so that the dust collection efficiency can be improved remarkably. Incidentally, symbols X_1 and X_2 in figures 9(a) and 9(b) represent the zones where the suction force is low and X_1 and X_2 satisfy the relation $X_1 < X_2$.

(5) Next, the shake-off efficiency of dust between the present invention and the prior art will be compared. In either case, the filter cloth is fitted to the retainer. Therefore, when the bag filters in the cylindrical shape and in the oval shape collect the dust, they adsorb the dust while they are supported by the adjacent connection rods and are under the inwardly recessed state due to the suction force. When the high pressure reverse cleaning air is jetted, they inflate greatly into the round shape due to the high pressure reverse cleaning air. The dust removing efficiency at this time is determined by the magnitude of change of the filter shape. As shown in Figure 10(b), the degree of change of the filter cloth shape in the outward direction can be made greater in the oval filter than in the round filter and the pulsation and surge in the longitudinal direction become more complicated in the former than in the latter. Therefore, the shake-off efficiency can be extremely improved.

Incidentally, symbols S_1 and S_2 in Figures 10(a) and 10(b) represent the change quantity of the filter cloth and they satisfy the relation $S_1 < S_2$.

(6) If one of the bag filter B lines is set to the dust collecting state (negative pressure) while the other is set to the reverse cleaning state (positive state), the dust that has once been wiped off is by far more likely to be adsorbed once again in the case of Figure 7(b) than in the case of Figure 7(a). In the drawings, symbols Y_1 and Y_2 represent the suction zones that hinder the drop of the dust, and they satisfy the relation $Y_1 > Y_2$.

(7) The conventional cylindrical retainer can be used for the vertical dust collector wherein the bag filters are vertically supported. In the case of the horizontal dust collector wherein the bag filters are supported horizontally in the transverse direction, however, a relatively large quantity of dust remains at the upper half portion of the bag filters as shown in Figure 8(a). However, if the retainers have the oval shape and are arranged with their small retainer width portion facing vertically, the bag filters can be efficiently stored in the horizontal dust collector, too, as shown in Figure 8(b), and the quantity of deposited dust is much smaller at the time of dust removal than in the case where the cylindrical bag filters are arranged.

Incidentally, symbols V_1 and V_2 in these drawings represent the quantity of deposited dust and they satisfy the relation $V_1 > V_2$.

(8) Since the bag filter fitted to the conventional cylindrical retainer can be used as such for the retainer of the present invention, the present invention is economical.

(9) Moreover, the blow tubes are arranged in such a manner as to cross at right angles the filter dimensions having a relatively large retainer width. Accordingly, when the reverse cleaning air is jetted, the impact force and impact wave make the bag filter rounded as much as possible and inflate them particularly greatly at their sides having a relatively small retainer width so that the adjacent filter cloths enter a kind of state where they stroke one another. Therefore, the wipe-off efficiency is extremely remarkable due to the change of the shape of the filter cloth.

If the flow tubes are arranged in such a manner as to cross at right angles the filter lines having a relatively small retainer width, on the other hand, the dust that has once been wiped off at the time of reverse cleaning is again adsorbed by the adjacent bag filter lines before it drops downward, and the wipe-off efficiency is lower than in the preferred arrangement.

CLAIMS

1. A bag filter dust collector in which a filter cloth is fitted to and supported by a retainer having a frame structure to provide a bag filter having a cylindrical shape, a plurality of said bag filters is suspended on separator means, and blow means are disposed for the jetting reverse cleaning air to said filters, wherein the spacing between one pair of opposed sides of said retainer is relatively small while the spacing between the other pair of opposed sides is relatively great.

2. A bag dust collector according to Claim 1 in which the blow means are arranged in such a manner as to cross at right angles the length of said filters having the relatively great spacing therebetween.

3. A bag filter dust collector according to either one of Claims 1 and 2 wherein said retainer has a substantially oval sectional shape such that one pair of opposed sides of said retainer are parallel planes with a relatively small spacing therebetween while the other of the opposed sides are arcuate surfaces with a relatively large spacing therebetween.

4. A bag filter dust collector according to either one of Claims 1 and 2 wherein said retainer has a substantially oval sectional shape such that one pair of opposed sides of said retainer are arcuate surfaces having a relatively large radius with a relatively small spacing therebetween while the other of the opposed sides are arcuate surfaces having a relatively small radius with a relatively large spacing therebetween.

5. A bag filter dust collector according to either one of Claims 1 and 2 wherein said retainer has a substantially oval sectional shape such that one of the opposed sides of said retainer are parallel planes with a rela-

tively small spacing therebetween while the other of the opposed sides are apexed with a relatively large spacing therebetween.

6. A bag filter dust collector according to either one of Claims 1 and 2 wherein said retainer has a substantially rectangular sectional shape such that one pair of opposed sides of said retainer are parallel planes which are relatively wide with a relatively small spacing therebetween while the other of the opposed sides are parallel planes having a relatively small width with a relatively large spacing therebetween.

7. A bag filter dust collector constructed arranged and adapted to operate substantially as hereinbefore described with reference to Figures 1(a), 1(b) and 1(c).

8. A bag filter dust collector constructed arranged and adapted to operate substantially as hereinbefore described with reference to Figures 2(a), 2(b) and 2(c).

9. A bag filter dust collector constructed arranged and adapted to operate substantially as hereinbefore described with reference to Figures 3(a), 3(b) and 3(c).

10. A bag filter dust collector constructed arranged and adapted to operate substantially as hereinbefore described with reference to Figures 4(a), 4(b) and 4(c).

11. A bag filter dust collector constructed arranged and adapted to operate substantially as hereinbefore described with reference to any one of Figures 5(a), 5(b) and 5(c).

12. A bag filter dust collector constructed arranged and adapted to operate substantially as hereinbefore described with reference to any one of Figures 6(b), 7(b), 8(b or 9(b).

13. A bag filter suitable for use in a dust collector according to any one of the preceding claims.

Published 1988 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office, Sales Branch, St Mary Cray, Orpington, Kent BR5 3RD. Printed by Burgess & Son (Abingdon) Ltd. Con. 1/87.